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Amendments to the Claims

Claim 1 has been amended to cite the cellulose fibers are crosslinked with an effective amount of an α-hydroxy polycarboxylic acid crosslinking agent in the presence of from about 0.1 % to about 2.6 % of the weight of the cellulose fiber of a $C_4 - C_{12}$ polyol. Support for this is found in Tables 1 and 2. The claim has also been amended to state that the Whiteness Index of the intrafiber crosslinked fibers is measured after curing at from 185°C to 215°C. The specification indicates that fibers can be cured at from 120°C to about 215°C, page 9, lines 19 - 21 and specific examples of curing are given in Table 3, page 15, at 185°C (360°F) and 193°C (380°F). Claim 5 has been canceled and incorporated into Claim1. Claim 6 has been amended to depend on Claim 1. Claim 19 has been amended to cite a further limitation of Claim 1.

The Rejection Of Claims 1, 3-7, 9, 10, 16 and 19 - 20 Under 35 U.S.C. 102 (b)

Claims 1, 3-7, 9, 10, 16 and 19-20 are rejected under 35 U.S.C. §102 (b) as anticipated by or, in the alternative, under 103 (a) as obvious over Hansen et al. US 5,589,256, the '256 reference.

Applicants submit the Examiner has not established a *prima facie* case of anticipation. A prima facie case of anticipation requires the presence of a single prior art reference disclosure of each and every element of the claimed invention arranged as in the claims.

As amended, Hansen et al. in the '256 reference do not disclose cellulose fibers reacted with an effective amount of a crosslinking agent in the presence of from about 0.1% to about 2.6 % of the weight of cellulose fiber of a C_4-C_{12} polyol. In fact, the reference states that the binder is present in an amount of at least 3 percent to no more than 80 percent by weight of the fibers, particles and binder. Below about 3 percent an insufficient amount of binder is present to achieve adequate binding, column 21, line 49 – line 54. Support for the weight of the polyol is given in the instant application in Table 1 and 2 where some addition levels of the polyols are in the 2 and 4 percent by weight on fiber, the citric acid crosslinking agent is at the 8 percent by weight on cellulose fibers and the catalyst is at the 2 percent by weight on cellulose fibers. When the polyol is 2%

by weight on the fiber, this level equates to 1.78 percent by weight of the fiber, crosslinking agent, polyol, and catalyst. At the 4 % by weight addition level this equates to 3.51 % by weight of the fiber, crosslinking agent, polyol and catalyst. Thus the disclosed levels of polyols do not overlap the instant claims. Also, the reference does not disclose the Whiteness Index, $WI_{(CDM-L)}$ greater than about 69.0, and an L value greater than about 94.5. Additionally, the reference does not show that the Whiteness Index is measured after curing at a temperature of from 185°C to 215°C. Because Hansen et al. do not disclose all the elements of the claim as arranged in the claim, the Examiner has not established a *prima facie* case of anticipation. Withdrawal of the rejection is respectfully requested.

The Rejection Of Claims 1, 3-7, 9, 10, 16 and 19 – 20 Under 35 U.S.C. 103 (a)

Claims 1, 3-7, 9, 10, 16 and 19-20 are rejected under 103 (a) as obvious over Hansen et al. US 5,589,256, the '256 reference.

The Supreme Court in KSR reiterated the framework for the objective analysis for determining obviousness under 35 U.S.C. 103 stated in *Graham v. John Deere Co.*, 383 U.S. 1,148 USPQ 459 (1966). Obviousness is a question of law based on underlying factual inquiries. The factual inquiries enunciated by the Supreme Court in KSR are: (a) determining the scope and content of the prior art, (2) ascertaining the differences between the claimed invention and the prior art; and (3) resolving the level of ordinary skill in the pertinent art.

Applicants submit the Examiner has not established a *prima facie* case of obviousness.

Hansen teaches the binding of particles to fibers. The binder has a functional group that forms a hydrogen bond with the fibers and a functional group that is also capable of forming a hydrogen bond or a coordinate covalent bond with particles that have a hydrogen bonding or coordinate bond with particles that have a hydrogen bonding or coordinate covalent bonding functionality. The fibers have hydrogen bonding functional sites. The fibers can be wood pulp fibers and includes those that are pretreated prior to the application of the binder. Hansen states the binder is present in an amount of at least 3 percent to no more than 80 percent by weight of the fibers,

particles and binder. Below about 3 percent an insufficient amount of binder is present to achieve adequate binding, column 21, line 49 – line 54. A preferred weight ratio of particle to binder is 2:1 to 4:1. The binders can be polymeric or non polymeric as cited in column 3, line 42 –column 4, line 18 and column 19 line 50 – column 20, line 61.

Application of the binder on high bulk fibers preferably occurs after the curing step, particularly if the binder is capable of functioning as a crosslinking material. Hansen cites that specific types of binders that can crosslink are polyols, polycarboxylic acids and polyamines. When these are present during curing the binder will be consumed to form covalently crosslinked bonds. When this occurs the binder is no longer available for hydrogen bonding or coordinate covalent bonding and particle binding to fibers is ineffective. Hansen discloses that when polycarboxylic acid, polyols, and polyamines are used as binders, the fibers should contain at least 20 % by weight water if *particles and binders* are present in the fibers when curing. The water inhibits covalent bond formation and prevents all of the binder from being used to form intrafiber covalent crosslinks. Thus some of the binder remains available to form non-covalent bonds with the particles, column, 23, line 4 – line 32.

Even though Hansen discloses specific types of binders that can crosslink such as polyols, polycarboxylic acids and polyamines, when crosslinking occurs, the binders are consumed and would destroy his invention. Hence there is the necessity of adding at least 20 % by weight water to inhibit covalent bond formation thus preventing all the binder being used to form covalent bonds. As a consequence, some binder remains to bind the particles. Thus one skilled in the art would not look to a reference that teaches binding of particles for increase of the Whiteness Index of the crosslinked fibers since crosslinking in the presence of a binder that can also crosslink destroys the binding that Hansen teaches.

There is no teaching in the Hansen reference to increase the Whiteness Index and L value of the crossslinked fibers. One skilled in the art would not look to the Hansen reference which teaches binding of particles to fibers to increase the Whiteness Index of fibers. As amended, below about 3 percent by weight of fiber and particles would be an insufficient amount of binder to achieve adequate binding in the Hansen invention, column 21, line 49 – line 54. Thus these levels of binder are

ineffective for the binding purposes of Hansen and destroy his invention. Since the level of polyol in the instant application is from 0.1 % to 2.6 % by weight on fiber, one skilled in the art would not look to the Hansen reference for a teaching of the instant application.

Furthermore, there is no teaching or suggestion in the Hansen et al. '256 reference to arrive at the instant invention and all elements of the claim are not cited. Hansen et al. teach away from using curing temperatures greater than 180°C. Also, the results of crosslinking of an α-hydroxy polycarboxylic acid in the presence of a polyol and measuring the Whiteness Index after curing at from 185°C to 215°C gives unexpected synergistic Whiteness Index results and the product is different from the product of the Hansen invention. The Hansen reference teaches crosslinking at 140 °C -180°C, above this there is scorching of the fibers and discoloration. One skilled in the art would recognize that discolored fibers would have a different structure that those claimed in the instant application where the fibers are cured at 185°C - 215°C. The results are also unpredictable since one skilled in the art would not have predicted that when cellulose fibers were crosslinked with an α-hydroxy polycarboxylic acid in the presence of a polyol such as sorbitol would result in a Whiteness Index greater than 69 when curing was conducted at 185°C to 215°C.

The '256 patent indicates that high bulk fibers with intrafiber crosslinks (i.e. covalent bonds) can be used in the invention, column 37, line 22-25. The reference teaches however, that in the preparation of these fibers, the curing stage temperatures of 140 °C to about 180 °C are used which is sufficient to effect curing of the crosslinking agent *without scorching* the dry fibers, column 40 line 63 - 66. The reference teaches that the dried and cured fibers *are not discolored* from *scorching* and the like, column 41, line 7-10. Thus the reference also teaches away from curing at higher curing temperatures which would result in scorched and discolored fibers which would have a different structure that the those in the instant application which have a high Whiteness Index as shown in the Stoyanov Declaration of September 29, 2006.

A factual inquiry in determining obviousness is resolving the level of ordinary skill in the pertinent art as defined in MPEP2141 II C., the person of ordinary skill in the art is a hypothetical person who is presumed to have known the relative art at the time of the invention. Factors that may be considered in determining the level of ordinary skill in

the art may include: (1) "type of problems encountered in the art," (2) "prior art solutions to those problems;" (3 "rapidity with which innovations are made;" (4) "sophistication of the technology; and (5) "educational level of active workers in the field. In a given case, every factor may not be present, and one or more factors may predominate." "A person of ordinary skill in the art is also a person of ordinary creativity, not an automation" KSR 82 USPQ2d at 1397."

Certainly Hansen is a person skilled in the art and fits the above definitions yet the disclosure of Hansen indicates that the curing temperature should be within the range of about 140°C to 180°C which is sufficient to effect the curing of the crosslinking agent without scorching the dry fibers. Hansen states the curing temperature depends upon the type of crosslinking materials used to treat the fibers and also is set at a level so as not to scorch the fibers during curing. Also, Hansen states that the fibers are not discolored from scorching, column 40, line 62 – column 41, line 9. Thus the only mention that Hansen makes is the adverse effect on color when crosslinked fibers are cured above 180°C. Hansen, being skilled in the art, does not disclose or recognize the beneficial effect of crosslinking with an α-hydroxy polycarboxylic acid in the presence of a polyol to achieve to claimed Whiteness Index and L value. Furthermore, since Hansen discloses crosslinking at from about 140°C to 180°C and recognizes that higher temperatures result in scorching and discoloration, being skilled in the art, would also recognize that the product from discoloration would have a low Whiteness Index relative to the claims in the instant application and therefore would also have a different structure than those in the instant application. Yet in the instant application, curing from 185°C to 215°C results in a Whiteness Index of greater than about 69 and an L value of greater than about 94.5 and therefore the structure is unobvious since it is different from the Hansen disclosure.

Applicants submit that curing the crosslinking agent in the presence of a polyol gives unexpected synergistic Whiteness Index results. The Examiner is requested to again review the Declaration of Angel Stoyanov submitted on October 9, 2006. Pulp has a Whiteness Index of 78.16 (Sample A). When pulp is treated with a catalyst, the Whiteness Index is 77.87 (Sample B). When pulp is treated with a catalyst and sorbitol, the Whiteness Index is 77.37 (Sample H). When pulp is treated with citric acid and a catalyst, the Whiteness Index *decreases to 68.69* (Sample C). However, when pulp is

treated with citric acid and a catalyst in the presence of sorbitol, the Whiteness Index *increases to 78.71* (Sample D). Thus whereas citric acid has an adverse effect on the Whiteness Index decreasing it from 77.87 (Sample B) to 68.69 (Sample C), when citric acid crosslinking of the fiber occurs in the presence of sorbitol, the Whiteness Index unexpectedly increases to 78.71 (Sample D) indicating an unexpected synergistic response by the addition of the sorbitol. The Whiteness Index measurements resulting from crosslinking cellulose with an α-hydroxy polycarboxylic acid in the presence of sorbitol, a polyol, at 185°C (360 °F) and 193°C (380 °F) are shown in Table 3 of the instant application show this unexpected synergistic effect.

Similar results are also realized when crosslinking cellulose fibers with citric acid in the presence of xylitol.

The '256 reference states that binders *and particles* of the invention can be added before, after or simultaneously with curing, column 42, line 31 – line 32. Hansen states that specific binders that can crosslink are *polyols*, polycarboxylic acids and polyamines and when such binders are present during curing the binder will be consumed during the curing step to form covalently crosslinked bonds. In the instant application cellulose fibers are reacted with an effective amount of an α- hydroxyl polycarboxylic acid crosslinking agent in the presence of from 0.1% to about 2.6 % of the weight of the cellulose fiber of a $C_4 - C_{12}$ polyol to form intrafiber crosslinked cellulosic fibers with a Whiteness Index (WI_{CDM-L}) greater than about 69 and an L value greater than about 94.5. If the polyols cited by Hansen indeed do crosslink then the structure of the final product would be different from the product in the instant application since, for example, sorbitol and xylitol are shown not to crosslink, see the September 29, 2006 Declaration of Stoyanov, entries H, I, J and K as evidenced by no increase in FAQ wet bulk. Hansen states that when curing the crosslinking material in the presence of a binder that is also a crosslinking material the fibers should contain at least 20 % water by weight of the fibers when curing begins, column 42, line 31 – line 57. Water inhibits ester bond formation and ensures that adequate binder will remain in the fibers to bind particles to the fibers. The Declaration of Stoyanov, attached herewith, shows that water does not inhibit the crosslinking reaction of citric acid which is both a binder, column 16, line 59 and a crosslinking agent, column 42, line 40. Thus the results are unexpected and nonobvious.

Applicants submit there is no motivation or suggestion in the Hansen et al. invention to arrive at the instant invention since, in the curing stage, Hansen et al. recite curing temperatures from 140 °C to about 180 °C and indicate that this range prevents scorching and discoloration and therefore a person skilled in the art would not be motivated to cure at higher temperatures because of the adverse effect on fiber color. Hansen et al. do not disclose all elements of the claims such as the Whiteness Index of greater than about 69, the L value greater than about 94.5 which is measured after curing at a temperature of from 185 °C to about 215 °C and the a and b value of the fibers. The wet bulk of the fibers is also not disclosed. Hansen et al. teach away from using curing temperatures greater than 180°C stating that these higher temperatures scorch and discolor the fibers. Furthermore the results of crosslinking cellulose with an α-hydroxypolycarboxylic acid in the presence of a polyol give unexpected synergistic results in the Whiteness Index. Since Claim 1 is nonobvious under U.S.C. § 103 (a) then any claim depending therefrom is nonobvious. *In re Fine,* 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir.1988). Withdrawal of the rejection is respectfully requested.

The Rejection Of Claims 1, 3-7, 10 – 12, 16 and 19 - 20 Under 102 (b)

Claims 1, 3-7, 10-12, 16 and 19-20 are rejected under 35 U.S.C. §102 (b) as anticipated by or, in the alternative, under 103 (a) as obvious over Hansen et al. US 5,589,256, the '326 reference.

Hansen, in the '326 patent, does not teach crosslinking of cellulose fibers with an effective amount of an α-hydroxy polycarboxylic acid in the presence of 0.1 to 2.6 % by weight of a $C_4 - C_{12}$ polyol, the Whiteness Index of greater than 69, the L value greater than about 94.5 and measurement of the Whiteness after curing at 185°C - 215°C. Since the cited reference fails to exactly describe the claimed invention, the reference is not anticipatory. Withdrawal of the rejection is respectfully requested.

The Rejection Of Claims 1, 3-7, 10 – 12, 16 and 19 - 20 Under 103 (a)

Claims 1, 3-7, 10-12, 16 and 19-20 are rejected under 35 U.S.C. §102 (b) as anticipated by or, in the alternative, under 103 (a) as obvious over Hansen et al. US 5,589,256, the '326 reference. The rejection under 102 (b) has been addressed.

Hansen teaches binding of particles to fibers with binders. The binder molecule has at least one functional group that is capable of forming a hydrogen bond or at least one coordinate covalent bond with particles and at least one functional group that is capable of forming a hydrogen bond with the fibers, column 4, line 8 – line 12. Contrary to the Examiner's statement, column 10, lines 26 -40 does not teach crosslinked fibers, rather, it teaches that fibers suitable for the invention are wood pulp fibers that have a basis weight of at least 350 g/m^2. One skilled in the art would recognize that these fibers are different from the high bulk fibers cited by Hansen in column 29, line 36 – line 39. With respect to the reference in column 45, lines 30 -33, this reference only discloses a method for crosslinking but does not disclose cellulosic fibers crosslinked with an α-hydroxy polycarboxylic acid crosslinking agent on the presence of a polyol.

Hansen states that in the production of high bulk fibers, polycarboxylic acids such as citric acid can be used for crosslinking, column 43, line 8 and are cured in a temperature range of from 140°C to 180°C without scorching the fibers and are not discolored from scorching, column 45, line 6 – line 18. Thus Hansen, who is skilled in the art, recognizes the adverse effect of temperatures greater than 180°C which would result in scorching and discoloration of the fibers. Furthermore, as now amended, the disclosed curing temperature does not significantly overlap the claimed range.

Hansen states that in certain situations the binder can also form covalent intrafiber crosslinks. Polycarboxylic acid such as citric acid, polyols, such as dipropylene glycol and polyamines can function as crosslinking agents and are consumed in the curing step in the formation of covalent crosslinks, column 46, line 7 – line 12. Hansen discloses that about 20 % water but more preferably 30 % water by weight of the fibers will sufficiently retard curing so that adequate binder functional groups remain in the fibers to bind the particles to the fibers. Hence when curing the crosslinking material in the presence of a binder that is also a crosslinking material the fibers should contain at least about 20 % by weight water when curing begins, column 46, line 8 – line 26.

Hansen states that combination of the binders as well as with other binders also may be used *providing they are non reactive*, that is providing that the binders do not react in a manner which prevents the binder from possessing the functional groups required for binding, column 27, line 3 – 8. Applicants submit there is no motivation to use citric acid in combination with another binder since citric acid is reactive as evidenced by it's use as a crosslinking agent. Furthermore, Hansen teaches away from using citric acid as a binder since it is reactive. Citric acid is a binder, column 25, see structural drawing. Citric acid is also a crosslinking agent, column 46, line 9 and is reactive. According to Hansen one would have to add at least 20 % by weight water when curing the crosslinking material in the presence of binder that is also a crosslinking material. As shown by the Stoyanov Declaration submitted herewith, adding 20 or 30 % by weight water to fibers which have been treated with a crosslinking agent (citric acid, an α-hydroxy polycarboxylic acid), a polyol (sorbitol), and a catalyst and then air dried, followed by the addition of water and then cured, does not affect crosslinking. This effect is both non predictable and unexpected. Accortding to Hansen, however, the addition of the water would prevent crosslinking. Furthermore, as shown in the Declaration by Stoyanov in the response of October 9, 2006, fibers crosslinked with citric acid, an α-hydroxy polycarboxylic acid and 2 % by weight sorbitol, an acyclic polyol, results in a Whiteness Index of 81 versus a control in which no polyol is present of 68.69.

If an independent claim is nonobvious under 103 then any claim dependent therefrom is nonobvious. *In re Fine,* 837 F.2d 1071, 5USPQ2d 1596 (Fed. Cir.1988). Hansen does not disclose the Whiteness Index greater than about 69, the L value, a value greater than about -1.55 and less than about -0.60 the b value less than about 8.50 and the wet bulk. The reference does not show all the structural limitations of the claims when cellulose fibers are crossslinked with an α-hydroxy polycarboxylic acid in the presence of 0.1-2.6 % by weight polyol (sorbitol is an acyclic polyol). Since these fibers are crosslinked at 185°C to 215°C, a temperature which Hansen states would scorch and discolor the fibers and result in discoloration, and thus a different structure at this elevated temperature, the fibers of the instant application are different and the results are

unexpected and a synergistic response is realized. Withdrawal of the rerjection is respectfully requested.

The Rejection Of Claims 8-9 Under U.S.C. 103 (a)

Claims 8 and 9 are rejected under 35 U.S.C. §103(a) as being unpatentable over Hansen et al. ('256 or '356) in view of Smith et al. U.S. 2002/0090511.

Claims 8 and 9 are dependent on Claim1. Since Claim 1 is nonobvious under U.S.C. § 103 (a) then any claim depending there from is nonobvious.

The Smith et al. invention relates to the use of refined cellulose fiber prior to crosslinking to achieve crosslinked fibers with low median desorption pressures and improved fluid drainage in acquisition and / or distribution layers compared to similar unrefined fibers, page 3 [0039]. The refined fibers may be crosslinked in the presence of a reducing agent to prevent yellowing of the fibers during the crosslinking reaction or they may be bleached during or after the crosslinking reaction to improve their appearance, [0068] and [0069]. Thus Smith et al. recognize the adverse effect of crosslinking and either prevents the yellowing by the addition of a reducing agent or treats the crosslinked fibers during or after curing to improve their appearance.

Hansen does not teach crosslinking with malic or tartaric acid as crosslinking agents.

There is no motivation to combine the references. Smith teaches the crosslinking of refined fibers and the yellowing of the fibers during the crosslinking reaction. Smith et al. overcome this yellowing by either adding a reducing agent to prevent yellowing or by bleaching during or after the crosslinking reaction to improve their appearance. The list of crosslinking agents includes malic acid and tartaric acid, both α-hydroxypolycarboxylic acids. However, even if one would combine the references, all the elements of the combined claims would not be present. Smith et al. when combined with the '256 reference do not teach crosslinking of cellulose with an α-hydroxy polycarboxylic acid crosslinking agent in the presence of a polyol, the amounts of polyol, the Whiteness Index greater than 69 and L values greater than about 94.5 measured after curing at 185 °C to about 215 °C.

When cellulose is crosslinked with citric acid, as shown in the Stoyanov Declaration submitted on October 9, 2006, the Whiteness Index is adversely affected,

sample C. Thus the skilled artisan would expect similar results with malic acid and tartaric acid, both of which are α-hydroxy polycarboxylic acids. Smith realizes the adverse effect of crosslinking with malic acid and overcomes this either by adding a reducing agent to prevent yellowing or bleaching. There is no motivation to combine malic acid, an α-hydroxy polycarboxylic acid, which would be expected to adversely affect the Whiteness Index, with a polyol such as sorbitol which, by itself, has been shown not to improve the Whiteness Index and arrive at the instant invention. As shown above, unexpected and synergistic results were obtained when cellulose fibers were crosslinked with citric acid, an α-hydroxypolycarboxylic acid in the presence of 0.1 to 2.6 % by weight polyol (eg sorbitol) at 185°C to 215°C to yield fibers with a Whiteness Index greater than 69 and an L value greater than about 94.5.

Withdrawal of the rejection is respectfully requested.

The Rejection Of Claims 13 -15 Under 35 U.S.C. 103 (a)

Claims 13 -15 are rejected under U.S.C. 103 (a) as unpatentable over Hansen et al '326).

Hansen, ('326) only discloses sorbitol, as a binder for wet laid fibers, Claims 3, 4, 18 and 19, for an airlaid mass of high bulk fibers, Claim11 and for an airlaid mass of fibers, Claim 23. The reference does not disclose the specific polyols of the instant claims. There is no motivation to combine the teachings in view of the fact that the reference teaches away from curing at temperatures greater than 180°C. The reference teaches that higher temperatures results in discoloration and scorching of fibers which in turn result in discolored fibers. As mentioned above, such fibers would have a different structure than the fibers in the instant fibers which have a Whiteness Index greater than 69 and an L value greater than about 94.5. Furthermore substitution of one polyol such as sorbitol with another such xylitol or mannitol would not have yielded predictable results since, as discussed, the structure is different from the fibers disclosed in the '326 patent which are crosslinked at from 140°C - 180°C. Withdrawal of the rejection is respectfully requested.

The Rejection Of Claims 11-15 Under 35 U.S.C. 103 (a)

Claims 11-15 are rejected under 35 USC § 103(a) as unpatentable over Hansen et al. ('256) in view of Hansen et al. US 5,789,326, the '326 reference.

Claim 1 is an independent claim, Claims 11-15 are dependent from Claim 1.

For a *prima facie* rejection, there must be a suggestion, teaching or motivation, either in the references or in the knowledge generally available to modify a reference, there must be a reasonable expectation of success, and all the claim limitations must be taught or suggested in the prior art.

The disclosure of Hansen et al, ('256) has been addressed above.

Like the '256 disclosure, the '326 disclosure concerns polymeric and non-polymeric binders for fibers and the use of such binders in binding particles to fibers. In particular embodiments the invention concerns binding particles or superabsorbent particles to cellulosic fibers which may then be used, for example, to make absorbent fibers that are densified and incorporated into cellulosic products. Like the '256 patent the '326 patent also states that in the production of high bulk fibers, column 42, line 16 – column 45, line 21, the fibers are exposed to a curing temperature of about 140 °C to about 180 °C which is sufficient to effect curing of the crosslinking agent without scorching the dry fibers. The fibers are also not discolored from scorching and the like, column 45, lines 6-21.Thus like the '256 parent the '326 patent also recognizes the adverse effect on color by curing above 180 °C and also teaches away from the higher curing temperatures of 185 °C to about 215 °C since this would discolor the fibers.

The Hansen et al. reference (the '326 patent) describes a wet laid web of fibers having hydrogen bonding functionality and the binder molecules having at least one functional group capable of forming a hydrogen bond or coordinate covalent bond with particles and at least one functional group capable of forming a hydrogen bond with the fibers column 3, lines 13-23. In another aspect the patent also describes high bulk fibers with hydrogen bonding functionality and similar binder characteristics.

The Examiner states that the '326 reference discloses sorbitol as a particle binder. Sorbitol as a particle binder is only disclosed in Claims 3 and 4 with the fibers which are in a wet laid web, Claim 1, with an air laid mass of high bulk fibers, Claims 11 and 12 and with a mass of air laid fibers, Claims 24 and 25. The '256 reference does not disclose the specific acycylic polyols and heterosides of the instant claims and the '326 reference only mentions sorbitol as a single binder in a group of binders consisting of glycerin, sorbitol, propylene glycol and carboxylic acids from which the

binder may be selected. As stated above, sorbitol is an acyclic polyol. Similarly, erythritol, xylitol, arabinatol, ribitol, manitol, persitol, and volmitol are acyclic polyols.

Hansen in the '256 reference does not disclose the specific acyclic polyols and heterosides of the instant claims. The Examiner states it would have been obvious to use sorbitol as a particle binder in the fibers of Hansen et al ('256) in view of Hansen et al. ('356) as a functionally equivalent option and have a reasonable expectation of success. Also that it would also have been obvious to one skilled in the art that the other claimed species of polyol (erythritol, xylitol, arabinitol, ribitol, mannitol, perseitol, volemitol, myo-inositol and lactitol) having structures similar to sorbitol (five to seven hydroxyl groups on adjacent carbon atoms) would react similarly.

Applicant submits that there is no suggestion, teaching or motivation, to combine the references and arrive at the instant invention. Both Hansen references teach away from curing crosslinked fibers at temperatures higher than 180°C since this would result in scorching and discoloration of the crosslinked fibers thus color would be adversely affected. Applicants have shown that there is a synergistic unexpected result as a consequence of crosslinking an α-hydroxy polycarboxylic acid in the presence of a polyol to achieve a Whiteness Index of greater than about 69 and an L value greater than about 94.5 after curing at 185 °C to about 215 °C. Furthermore, all the claim limitations are not taught including crosslinking cellulose with an α-hydroxy polycarboxylic acid in the presence of from about 0.1 to 2.6 % of the weight of the cellulose fiber of a C_4–C_{12} polyol and the Whiteness Index of greater than 69 and L value greater than about 94.5 of the crosslinked fibers measured after curing the fibers at 185 °C to about 215 °C. Withdrawal of the rejection is respectfully requested.

Double Patenting Rejection

Claims 1, 5-8 and 10-15 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over (renumbered) claims 1-9 and 11-12 in copending Application No. 10/748977.

Claims 1, 5-8, 10-12 and 16 are provisionally rejected under the doctrine of obviousness-type double patenting as being unpatentable over Claims 1-8 and 13 of copending Application No. 10/815206.

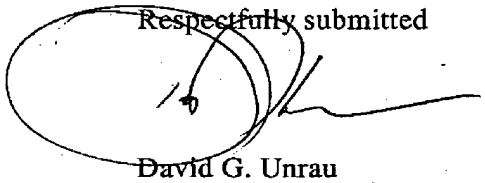
Claims 1, 3 - 8, 10, and 12-16 are rejected under the doctrine of obviousness-type double patenting as being unpatentable over Claims 1-11 of copending Application No. 10/748969.

Applicants note the double patenting rejection and will file a terminal disclaimer on the notification of allowable subject matter.

CONCLUSION

Based on the remarks, the Examiner is respectfully requested to withdraw the rejection of the claims and to promptly allow the case and allow it to issue. If the Examiner has any further questions, he is invited to call the Applicant's Agent at the number listed below.

Respectfully submitted



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